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U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555

Serial No. 06-1013  
KPS/LIC/RS: RO  
Docket No. 50-305  
License No. DPR-43

**DOMINION ENERGY KEWAUNEE, INC.**  
**KEWAUNEE POWER STATION**  
**LICENSEE EVENT REPORT 2006-012-00**

Dear Sirs:

Pursuant to 10 CFR 50.73, Dominion Energy Kewaunee, Inc., hereby submits the following Licensee Event Report applicable to Kewaunee Power Station.

Report No. 50-305/2006-012-00

This report has been reviewed by the Plant Operating Review Committee and will be forwarded to the Management Safety Review Committee for its review.

If you have any further questions, please contact Mr. Richard Sattler at (920) 388-8121.

Very truly yours,

*Kevin Davidson*  
KEVIN DAVIDSON for

Leslie N. Hartz  
Site Vice President, Kewaunee Power Station

Attachment

Commitments made by this letter: NONE

*IK22*

*Rec'd 3/6/07  
Process per  
Vernon Hodge*

RECEIVED JAN 3 2007

cc: Regional Administrator, Region III  
U.S. Nuclear Regulatory Commission  
2443 Warrenville Road  
Suite 210  
Lisle, IL 60532-4352

Mr. L. Raghavan  
Project Manager  
U.S. Nuclear Regulatory Commission  
Mail Stop 8 H4A  
Washington, D. C. 20555

NRC Senior Resident Inspector  
Kewaunee Power Station

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## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [infocollects@nrc.gov](mailto:infocollects@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0066), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)

Kewaunee Power Station

DOCKET NUMBER (2)

05000305

PAGE (3)

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TITLE (4)

Reactor Trip from Loss of Instrument Bus

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	30	2006	2006	012	00	12	29	2006	FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR : (Check all that apply) (11)							
POWER LEVEL (10)		93	20.2201(b)			20.2203(a)(3)(ii)			50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
			20.2201(d)			20.2203(a)(4)			50.73(a)(2)(iii)	50.73(a)(2)(x)
			20.2203(a)(1)			50.36(c)(1)(i)(A)		X	50.73(a)(2)(iv)(A)	73.71(a)(4)
			20.2203(a)(2)(i)			50.36(c)(1)(ii)(A)			50.73(a)(2)(v)(A)	73.71(a)(5)
			20.2203(a)(2)(ii)			50.36(c)(2)			50.73(a)(2)(v)(B)	OTHER
			20.2203(a)(2)(iii)			50.46(a)(3)(ii)			50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)			50.73(a)(2)(i)(A)			50.73(a)(2)(v)(D)	
			20.2203(a)(2)(v)			50.73(a)(2)(i)(B)			50.73(a)(2)(vii)	
			20.2203(a)(2)(vi)			50.73(a)(2)(i)(C)			50.73(a)(2)(viii)(A)	
			20.2203(a)(3)(i)			50.73(a)(2)(ii)(A)			50.73(a)(2)(viii)(B)	

## LICENSEE CONTACT FOR THIS LER (12)

IE

John Sattler

TELEPHONE NUMBER (Include Area Code)

(920) 388-8121

## COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

## SUPPLEMENTAL REPORT EXPECTED (14)

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO					

## ABSTRACT

At 8:48 CST on 10/30/2006, Kewaunee Power Station tripped from approximately 92% full power due to steam generator B steam flow/feedwater flow mismatch coincident with low water level on steam generator B. The cause of the plant transient that led to the reactor trip was a loss of the red instrument bus. The bus deenergized due to component failure during the performance of maintenance on its inverter.

Following the reactor trip;

- The auxiliary feedwater pumps automatically started, as designed, due to low-low level in the steam generators. No other safeguards systems actuated during the transient.
- Non-safety related valve MS-201B1, steam supply to reheater 1B reheater inlet valve, did not fully close. This resulted in pressurizing high pressure feedwater heater (15B) causing relief valve HD-130B, 15B feedwater heater relief valve, to lift.
- After the turbine trip, during bus transfer, non-safety related 4160V reserve auxiliary transformer breaker failed to close resulting in bus 4 losing power. This resulted in a loss of circulating water flow, which, in turn, caused a loss of condenser vacuum and condenser steam dump valves.

This event is being reported under 10 CFR 50.73(a)(2)(iv)(A) as an event or condition that resulted in automatic actuation of the reactor protection system and the auxiliary feedwater system.

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Kewaunee Power Station	05000305	2006	-- 012 --	00	2 of 4

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**EVENT DESCRIPTION**

At 8:48 CST on 10/30/2006, shortly after a scheduled increase in reactor power from 88% to 92%, and during preventative maintenance to adjust the free running frequency of inverter BRA-111 [INVT], the inverter output failed. This deenergized instrument bus 1 [EE] which resulted in the steam generator (SG)[SG] B feedwater regulating valve [SJ][LCV] going closed. This caused a steam flow to feed flow mismatch which resulted in a reactor trip on "SG B Steam Flow Greater Than Feedwater Flow" coincident with low water level in SG B [JB].

Following the reactor trip;

- The auxiliary feedwater (AFW) pumps [BA][P] automatically started, as designed, due to low level in the SGs.
- Non-safety related valve MS-201B1, steam supply to reheater 1B reheater inlet valve [V], did not fully close. This resulted in pressurizing high pressure feedwater heater 15B [HX] causing HD-130B, 15B feedwater heater relief valve [RV], to lift.
- After the turbine trip, during bus transfer, non-safety related 4160V reserve auxiliary transformer (RAT) [XFMR] breaker [BKR] 1-407 failed to close resulting in bus 4 losing power. This resulted in a loss of circulating water [KE] flow, which, in turn, caused a loss of condenser vacuum [SH] and condenser steam dumps [JI][FCV].

After quarantine and a preliminary investigation, 4160 volt circuit reserve aux transformer breaker 1-407 was replaced with a spare breaker and power was restored to bus 4.

By 11:00 CST, the plant status was; at normal operating temperature and pressure with the unaffected circulating water pump [P] running and condenser vacuum restored.

**EVENT ANALYSIS and SAFETY SIGNIFICANCE**

The plant trip was caused by the inverter failure which caused the SG B feedwater regulating valve to fail closed resulting in "SG B Steam Flow Greater Than Feedwater Flow" coincident with low water level in SG B. The inverter failure was determined to be due to failure of the static switch silicon controlled rectifiers (SCRs)[SCR], which caused an over current condition on the SCR gating circuit, damaging the gating resistors. The vendor was contacted and recommended against replacement of the same SCRs in the other station inverters (since they have no expected in-service life expectancy and no recommended preventative maintenance(PM)). Based on this and the operating and PM history of these inverters, the decision was made to limit the extent of condition to the failed inverter only.

The breaker failure was determined to be due to a failed closing coil interlock switch [33]. A misalignment of the roll pin for the interlock switch actuating arm allowed excessive free movement to occur during breaker racking, closing, opening, and spring charging. The free movement allowed a misalignment to occur while actuating the interlock switch. This misalignment impacted the switch by the application of forces not parallel to the plunger normal travel. The forces, over time, damaged the switch enclosure. The damaged enclosure impeded the contacts of the switch internals to correctly make up (normally closed) during the event.

The investigation revealed that there were other similar non-safety related breakers (load and supply) susceptible to this failure mechanism. The safety related breakers are of a different design and thus not

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subject to the same failure mechanism. For the non-safety breakers, the damage is on the back side of the switch enclosure and is not visible without some disassembly. The non-safety breakers will be inspected as plant conditions permit, but the breakers of highest concern are the other three supply breakers with an automatic closure function (supply from the RAT). These supply breakers closed properly following the plant trip, and are required to be closed to maintain their buses energized with the plant off-line. All affected breakers have been scheduled for inspection in accordance with the Work Management Process.

The sticking of the steam supply to reheater 1B reheater inlet valve was determined to be due to a galled valve plug (showing that the bottom bonnet was not installed squarely). The valve stem was replaced, the valve plug was polished, the packing was replaced, and the valve was tested satisfactorily. No other valves exhibited sticking during the trip so the extent of condition was limited to this valve only. Subsequent to the recovery from this event, another reactor trip occurred and this valve stuck again. For that event, an inspection of the valve was performed and stem bushings were replaced.

With the exceptions noted above, the plant responded as designed. All safety-related equipment performed its safety-related functions as designed. There was a loss of normal heat sink, but even though it was consciously not placed into immediate service, the alternate circulating water pump was available throughout the event and could have been used to restore the normal heat sink. There were no plant or public health and safety consequences. Therefore, this event is considered to have negligible safety significance.

post-trip event review was performed and, following troubleshooting and repairs, the plant was restarted at 04:27 CST on 11/1/06.

This event is being reported under 10 CFR 50.73(a)(2)(iv)(A) as an event or condition that resulted in an automatic actuation of the Reactor Protection System and the AFW System.

**CAUSE and CORRECTIVE ACTIONS**Inverter Failure

The cause of the inverter failure was determined to be failure of the static switch-SCRs which caused an over current condition on the SCR gating circuit, damaging the gating resistors. By 21:22 CST on 10/31/06, the inverter had been repaired and restored to normal operation.

Reserve Aux Transformer 4160V Breaker

The cause of the breaker failure was determined to be a failed closing coil interlock switch [33]. The failed supply breaker was replaced with a spare breaker and power was restored to Bus 4. The failed supply breaker was subsequently repaired. The other three supply breakers were scheduled for inspection when the main auxiliary transformer is supplying house loads. The load breakers were scheduled for inspection as plant conditions permit.

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Steam Supply To Reheater 1B Reheater Inlet Valve

The cause of the valve sticking was determined to be a galled valve plug (showing that the bottom bonnet was not installed squarely). This valve had previously failed to close during the shutdown for the outage on 9/2/06 and was repaired during that outage. Following this occurrence, the valve stem was replaced, the valve plug was polished, the packing was replaced, and the valve was tested satisfactorily. Subsequent to the recovery from this event, another trip occurred and this valve stuck again. For that event, an inspection of the valve was performed and stem bushings were replaced.

**PREVIOUS SIMILAR EVENTS**

LER 84-014, Reactor Trip Due To A Loss Of Power On Instrument Bus IV